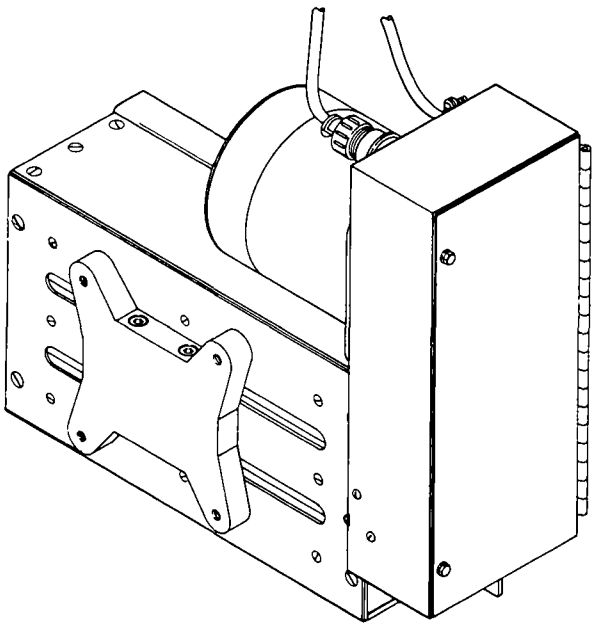
October 1985 FORM: OM-1096A

Effective With Serial No. JF-22

IMPORTANT: Read and understand the entire contents of both this manual and the power source manual used with this unit, with special emphasis on the safety material throughout both manuals, before installing, operating, or maintaining this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.

MODEL
MOTORIZED SLIDE
MOTORIZED SLIDE CONTROL
MSC-2



OWNER'S MANUAL

MILLER ELECTRIC MFG. CO.
718 S. BOUNDS ST, P.O. Box 1079
APPLETON, WI 54912 USA

ADDITIONAL COPY PRICE 50 CENTS

NWSA CODE NO. 4579
PRINTED IN U.S.A.

LIMITED WARRANTY

EFFECTIVE: FEBRUARY 25, 1985

This warranty supersedes all previous MILLER warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY - Subject to the terms and conditions hereof, Miller Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by Miller is free from defect in workmanship and material as of the time and place of delivery by Miller. No warranty is made by Miller with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any . All engines are warranted by their manufacturer for one year from date of original purchase, except Tecumseh engines which have a two year warranty.

Except as specified below, Miller's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLERMATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

Miller shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources and components .... 1 year
2. Original main power rectifiers ..... 3 years (labor - 1 year only)
3. All welding guns, feeder/guns and plasma torches... 90 days
4. All other Millermatic Feeders..... 1 year
5. Replacement or repair parts, exclusive of labor .. 60 days
6. Batteries..... 6 months

provided that Miller is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, Miller may honor claims submitted by the original user within the foregoing periods.

In the case of Miller's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be, at Miller's option (1) repair or (2) replacement or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at Customer's risk and expense. MILLER's option of repair or replacement will be F.O.B., Factory, at Appleton, Wisconsin, or F.O.B., at a MILLER authorized service facility, therefore, no compensation for transportation costs of any kind will be allowed. Upon receipt of notice of apparent defect or failure, Miller shall instruct the claimant on the warranty claim procedures to be followed.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND *NOT* FOR CONSUMERS OR CONSUMER USE. MILLER'S WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

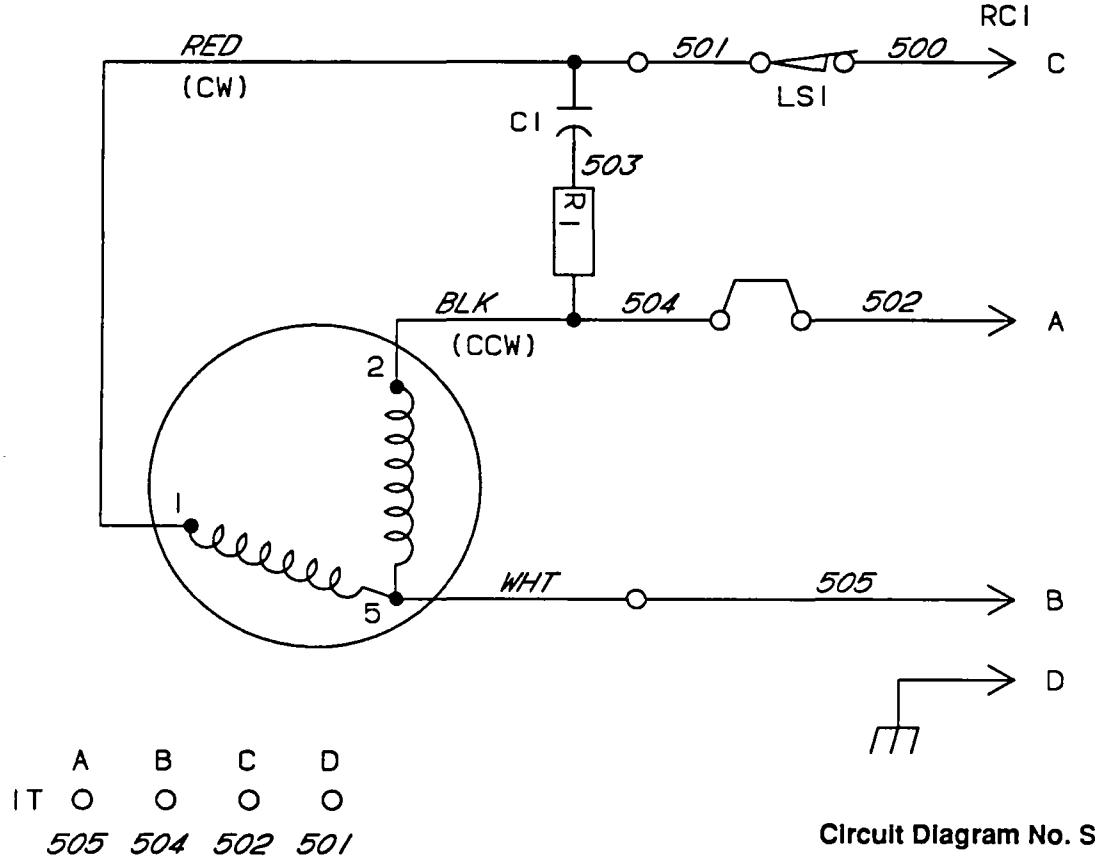
August 12, 1991 FORM: OM-1096A

ERRATA SHEET

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

AMENDMENT TO SECTION 4 – MAINTENANCE & TROUBLESHOOTING

Amend Figure 4-1. Circuit Diagram For Motorized Slide



Circuit Diagram No. SA-123 536

Figure 4-1. Circuit Diagram For Motorized Slide Effective With Serial No. JJ494608

AMENDMENT TO PARTS LIST

Amend Parts List as follows:

**	Dia. Mkgs.	Part No.	Replaced With	Description	Quantity
2-16		059 712	059 712	CLIP, (qty chg Eff w/KB107753)	3
2-19		090 637	148 315	BRACKET, mtg resistor/capacitor (Eff w/KB107753)	1
2-20		090 634	148 316	DOOR, access (Eff w/KB107753)	1
2-21		007 532	Deleted	Eff w/KB107753	
2-22	C1	089 475	148 317	CAPACITOR, polye met film 7.5uf 250VAC (Eff w/KB107753)	1
4-20		090 117	107 623	SWITCH, job stick (Eff w/JG026925)	1

**First digit represents page no - digits following dash represent item no.
BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

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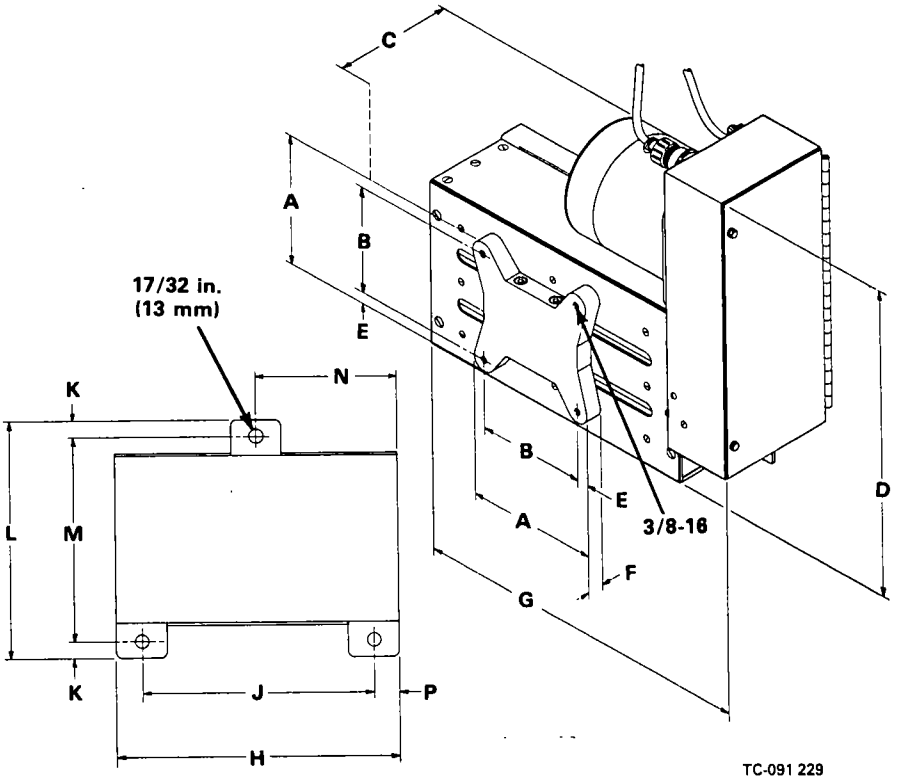
Input Power	Slide Load Capacity*	Travel Speed	Total Slide Travel	Voltage At Motorized Slide Control	Weight	
					Net	Ship
115 Volts AC	Vertical Mtg. - 75 lbs. (34 kg) Horizontal Mtg. - 74 lbs. (33 kg)	18 ipm (0.457 mpm) 27 ipm** (0.686 mpm)	5 in. (127 mm)	24 Volts AC	32 lbs. (14.5 kg)	45 lbs. (20.4 kg)

*Capacities given are at 12 in. (305 mm) from slide cover face plate (see Figure 1-3).
**With optional pulleys.

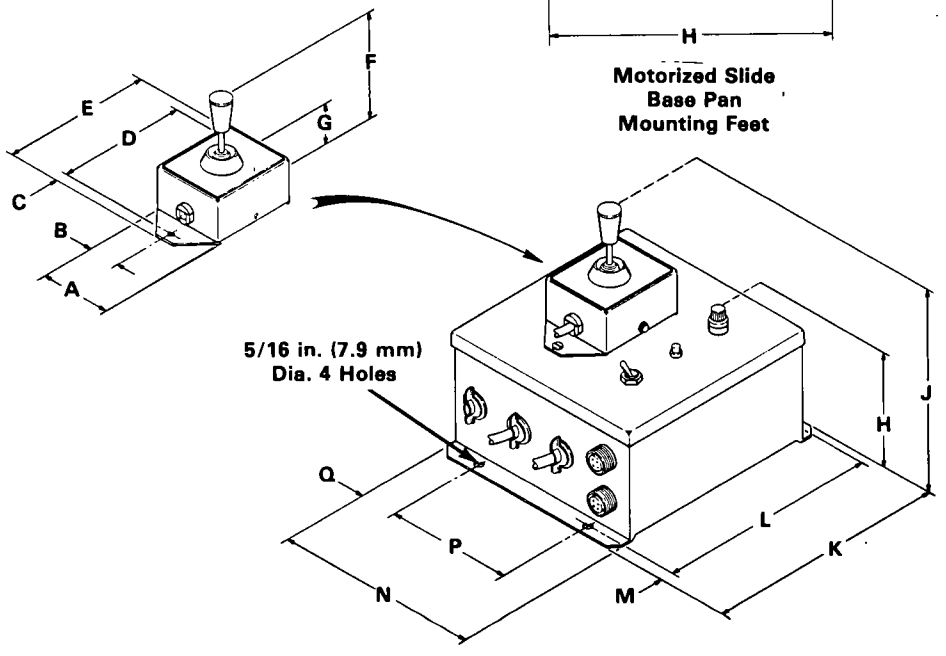
Figure 1 - 1. Specifications

Motorized Slide Dimensions		
Dimension	Inches	Millimeters
A	5-1/16	129
B	4-1/4	108
C	5	127
D*	12-7/8	327
E	13/32	10
F	5/8	16
G	14	356
H	11-3/16	284
J	9-3/16	233
K	5/8	16
L	9-3/8	238
M	8-1/8	206
N	5-19/32	142
P	1	25

*14-3/8 in. (365 mm) to bottom of mounting feet.

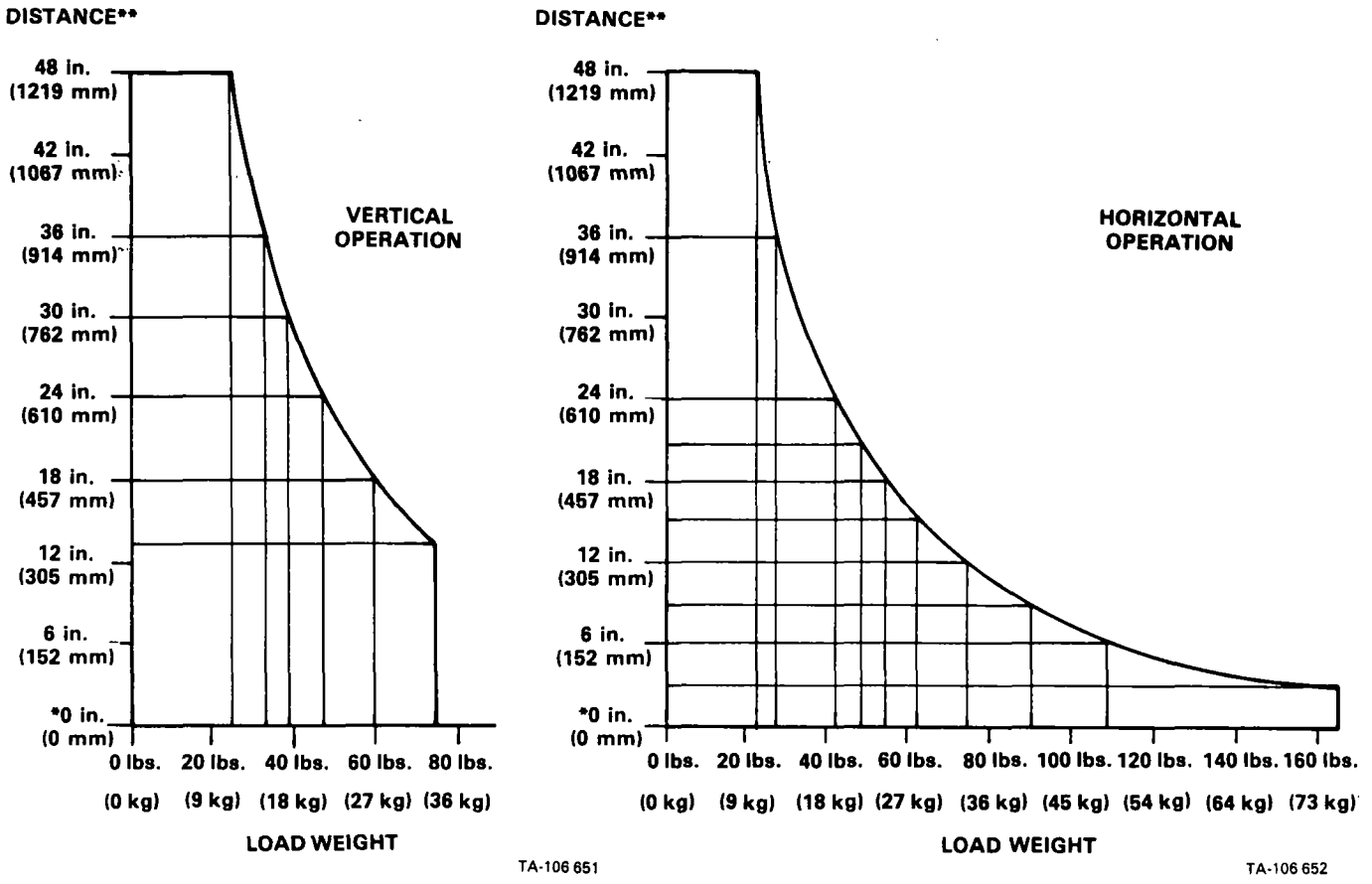


Motorized Slide Base Pan Mounting Feet



MSC-2 Dimensions		
Dimension	Inches	Millimeters
A	2-7/8	73
B	1-7/16	37
C	1/4	6
D	4-11/16	119
E	5-1/4	133
F	4-1/2	114
G	2	51
H	5-1/4	133
J	9	229
K	9-1/2	241
L	8-3/4	222
M	3/8	10
N	8	203
P	5	127
Q	1-1/2	38

Figure 1 - 2. Overall Dimensions


DISTANCE**
48 in. (1219 mm)
42 in. (1067 mm)
36 in. (914 mm)
30 in. (762 mm)
24 in. (610 mm)
18 in. (457 mm)
12 in. (305 mm)
6 in. (152 mm)
*0 in. (0 mm)
VERTICAL OPERATION
0 lbs. 20 lbs. 40 lbs. 60 lbs. 80 lbs.
(0 kg) (9 kg) (18 kg) (27 kg) (36 kg)
LOAD WEIGHT
TA-106 651
DISTANCE**
48 in. (1219 mm)
42 in. (1067 mm)
36 in. (914 mm)
30 in. (762 mm)
24 in. (610 mm)
18 in. (457 mm)
12 in. (305 mm)
6 in. (152 mm)
*0 in. (0 mm)
HORIZONTAL OPERATION
0 lbs. 20 lbs. 40 lbs. 60 lbs. 80 lbs. 100 lbs. 120 lbs. 140 lbs. 160 lbs.
(0 kg) (9 kg) (18 kg) (27 kg) (36 kg) (45 kg) (54 kg) (64 kg) (73 kg)
LOAD WEIGHT
TA-106 652

*0 in. as referenced from motorized slide cover (face plate), and not from equipment mounting plate.
**Center of gravity distance from motorized slide cover (face plate)

Figure 1 - 3. Weight And Distance Charts

1 - 1. GENERAL INFORMATION AND SAFETY

A. General

Information presented in this manual and on various labels, tags, and plates provided on the unit pertains to equipment design, installation, operation, maintenance, and troubleshooting which should be read, understood, and followed for the safe effective use of this equipment.

B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated, and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 - Safety Rules For Operation Of Arc Welding Power Source in the welding power source Owners Manual.

Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by the signal words **WARNING** and **CAUTION** which identify different levels of hazard.

WARNING statements include installation, operating, and maintenance procedures or practices which if not carefully followed could result in serious personal injury or loss of life.

CAUTION statements include installation, operating, and maintenance procedures or practices which if not carefully followed could result in minor personal injury or damage to this equipment.

A third signal word, **IMPORTANT**, highlights instructions which need special emphasis to obtain the most efficient operation of this equipment.

1 - 2. RECEIVING-HANDLING - Prior to installing this equipment, clean all packing material from around the unit and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed **by the purchaser with the carrier.** A copy of the bill of lading will be furnished by the manufacturer on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Model Description and Serial (or Style) Number of the equipment be supplied.

1 - 3. DESCRIPTION - The motorized slide is designed to provide accurate movement of a welding gun either horizontally or vertically. To obtain both vertical and horizontal gun movement, an optional adapter plate and two slides must be used. An MSC-2 (Motorized Slide Control) or a SYSTEM 9 weld control will provide electrical power and control gun movement at the slide.

When used with a SYSTEM 9, gun movement at the slide is obtained automatically; however, if manual control is desired, an optional Slide Control (joystick) is available for installation to the SYSTEM 9 unit.

When used with the MSC-2, gun movement at the slide is obtained manually with the MSC-2 slide control (joystick). A terminal strip inside the MSC-2 is provided for connecting to an automatic device (weld control) to obtain automatic control of slide movement.

SECTION 2 - INSTALLATION

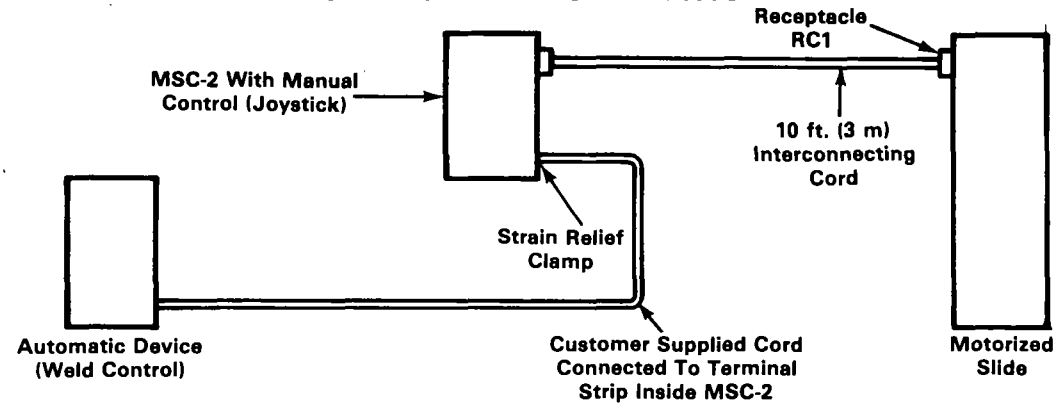

Receptacle RC1
MSC-2 With Manual Control (Joystick)
10 ft. (3 m) Interconnecting Cord
Strain Relief Clamp
Automatic Device (Weld Control)
Customer Supplied Cord Connected To Terminal Strip Inside MSC-2
Motorized Slide
TA-099 202

Figure 2 - 1. Motorized Slide And MSC-2 With Automatic Device Connection Diagram

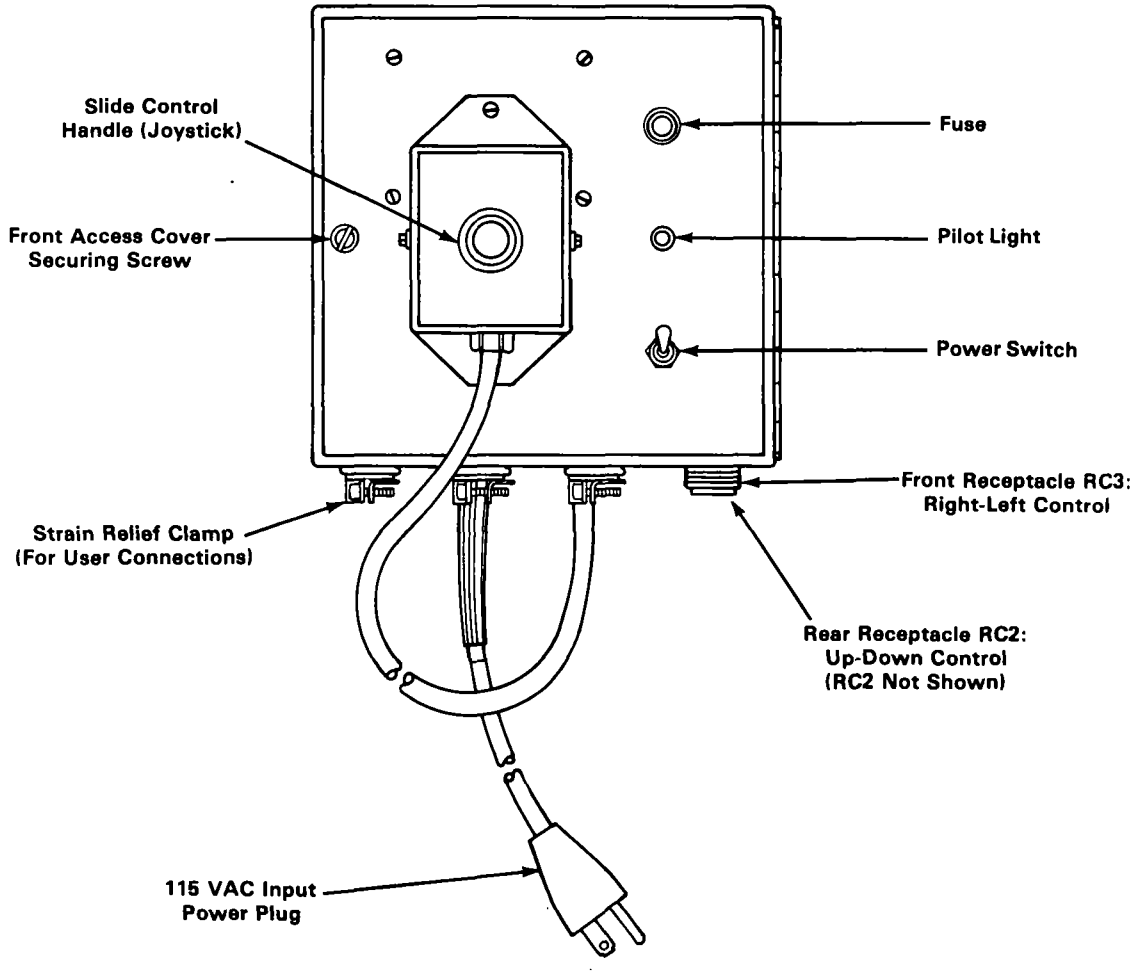

Slide Control Handle (Joystick)
Front Access Cover Securing Screw
Fuse
Pilot Light
Power Switch
Front Receptacle RC3: Right-Left Control
Strain Relief Clamp (For User Connections)
Rear Receptacle RC2: Up-Down Control (RC2 Not Shown)
115 VAC Input Power Plug
TA-098 878

Figure 2 - 2. MSC-2 Connections And Controls

2 - 1. LOCATION (Figures 1-2 And 2-1)

IMPORTANT: *The slide should be mounted with the motor up (on top) to keep the motor and cables free from heat and weld spatter.*

The motorized slide is shipped with a ten foot (3 m) interconnecting cord. Mount and secure slide at desired location, within ten feet (3 m) of the SYSTEM 9 weld control or MSC-2, using the provided mounting holes. Two slides can be installed together for up/down and right/left movement. Installing an optional adapter plate onto first slide allows installation of a second slide.

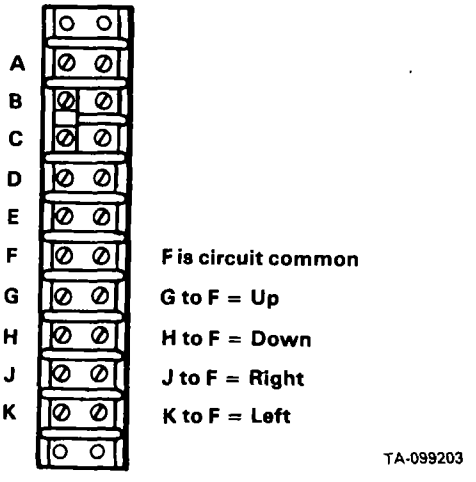


Figure 2 - 3. Terminal Strip 1T Inside MSC-2

The MSC-2 may be installed in a permanent location, within ten feet (3 m) of both the motorized slide and a 115 volts ac power source. Mount and secure the MSC-2 at the desired location using the provided mounting holes in the case.

2 - 2. INTERCONNECTING CORD INSTALLATION FROM MOTORIZED SLIDE TO MSC-2 (Figures 2-1 And 2-2) - Connect the 4-socket plug on one end of interconnecting cord (supplied with slide) to the 4-pin receptacle RC1 on gear housing of motorized slide. Align keyways and insert plug into receptacle and rotate plug threaded collar clockwise. Route remaining end of interconnecting cord to MSC-2, and connect 4-pin plug to the appropriate 4-socket receptacle. The front receptacle RC3 labeled RIGHT-LEFT controls a slide mounted horizontally, and the rear receptacle RC2 labeled UP-DOWN controls a slide mounted vertically (see Figure 2-2).

2 - 3. ELECTRICAL CONNECTION FROM AN AUTOMATIC DEVICE (Weld Control) TO THE MSC-2 (Figures 2-1, 2-2, And 2-3) - The MSC-2 is designed with remote automatic control capability. For an automatic device to control slide movement, it must have a unique contact closure for each desired direction. If two slides (4 directions) are desired, the automatic device must have four different relays. Directional control connections of contact closures to MSC-2 terminal strip 1T are shown in Figure 2-3.

Depending on connections made at MSC-2 terminal strip 1T as shown in Figure 2-3, and the position of the installed motorized slide, the gun mounting plate will move when a contact closes and stop when that contact opens. Timing of the contact closures with regard to gun movement must be controlled by the automatic device.

To make connections from an automatic device to the MSC-2, proceed as follows:

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*
- *Shut down weld control, MSC-2, and welding power source and disconnect them from line power employing "lockout/tagging procedures" before beginning this installation.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

1. Open hinged front cover.
2. Route leads from automatic device through strain relief clamp located on the same side of the MSC-2 as the power cord (see Figure 2-2) and up to terminal strip 1T.
3. Make connections for slide movement desired with regard to position of installed slide at terminal strip 1T inside unit (see Figure 2-3).

IMPORTANT: *The motor operates by means of a maintained contact closure (a contact closure in this case is a set of contacts with no electrical power applied to them). Do not allow motor to receive two opposing contact closure signals at the same time. Do not allow contact closure to be maintained after the slide has reached the end of its travel (a limit switch may be used to stop slide movement as desired by overriding the contact closure).*

4. Tighten strain relief clamp screws.
5. Close and secure cover.

2 - 4. ELECTRICAL INPUT CONNECTION FOR MSC-2 (Figure 2-2)

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*
- *Do not cut ground terminal off plug.*
- *Ground in accordance with National Electrical Code, state, and local codes.*

This unit will be electrically hot internally when the 115 vac plug is connected to an energized supply.

The MSC-2 is equipped with a 115 volts ac 3-prong parallel plug. Connect the plug to a matching, grounded receptacle.

2 - 5. ELECTRICAL CONNECTION TO MOTORIZED SLIDE WITH SYSTEM 9 (Figures 2-4 And 2-5)

WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Shut down the weld control and disconnect input power (115 vac) before making any terminal strip connections.*

To make connections between the motorized slide and SYSTEM 9, proceed as follows:

1. Connect the four-socket plug on the ten foot (3 m) interconnecting cord to the four-pin receptacle RC1 on the gear housing of the motorized slide.

2. Route the two foot (0.6 m) interconnecting cord through the strain relief on the side of SYSTEM 9 and make connections as illustrated in Figure 2-5.

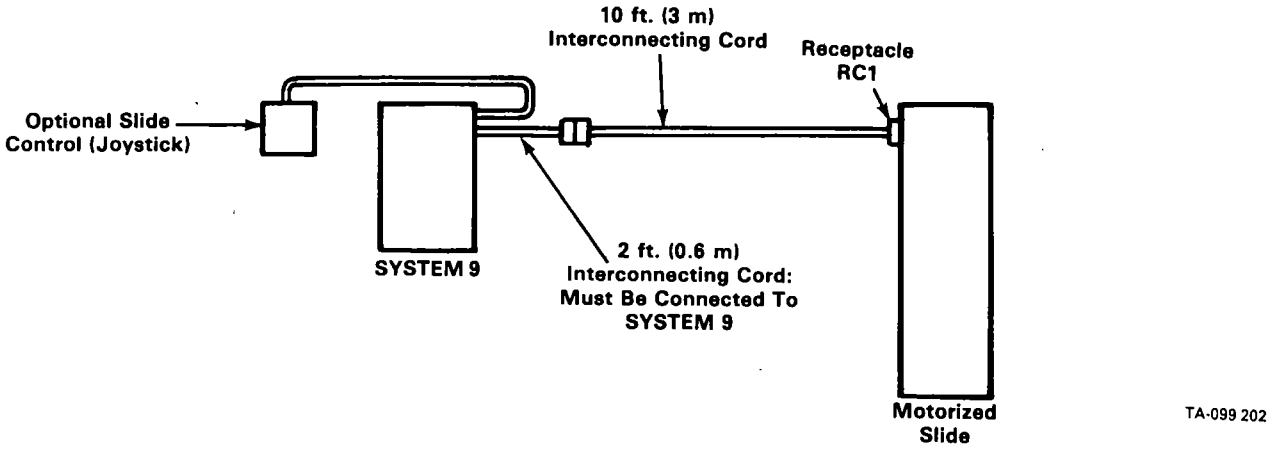


Figure 2 - 4. Motorized Slide And SYSTEM 9 Connection Diagram

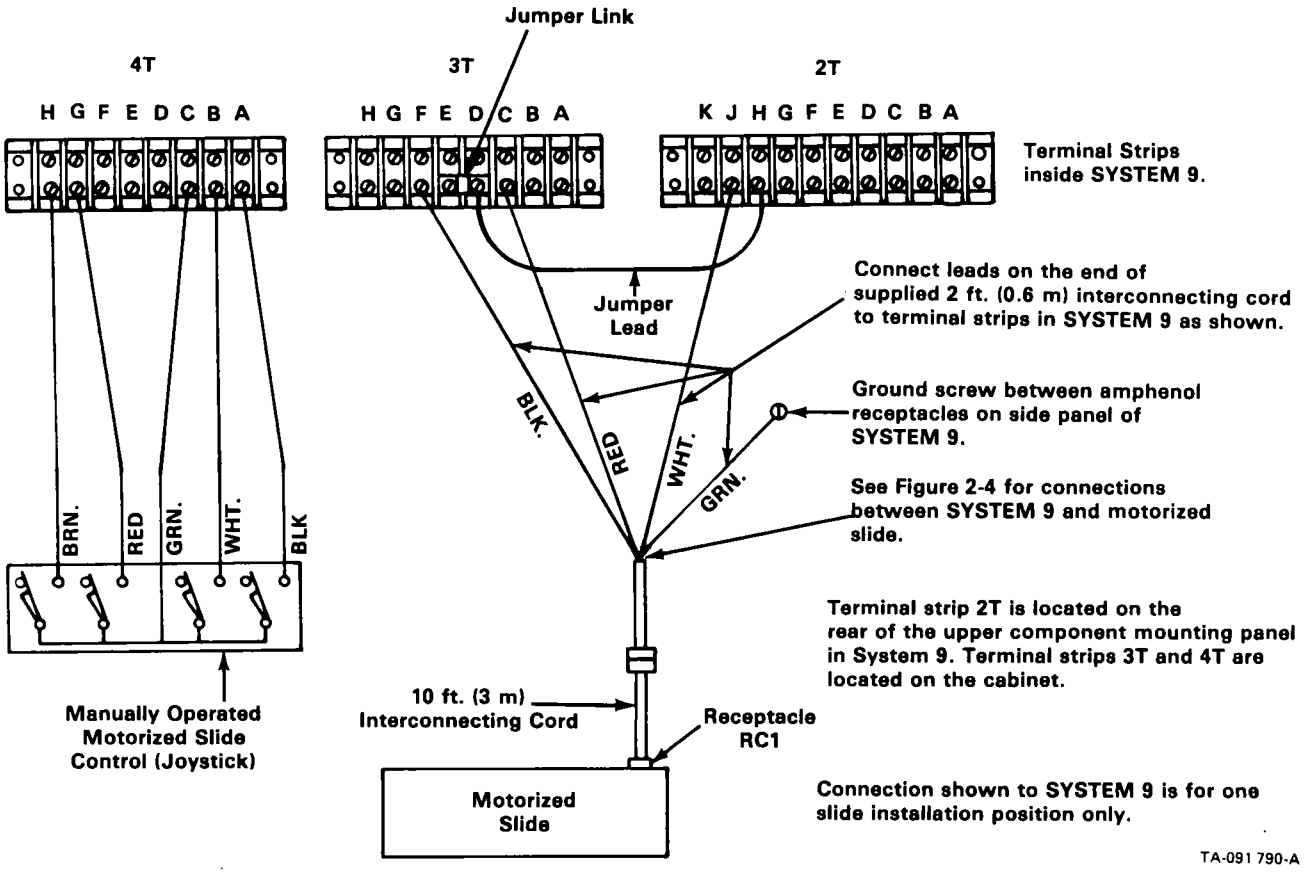


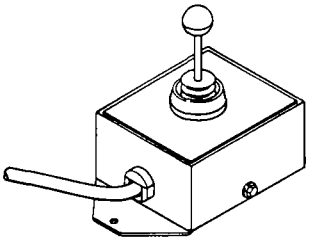
Figure 2 - 5. Motorized Slide Connection To System 9

3. Connect supplied jumper lead from terminal H on terminal strip 2T to terminal D on terminal strip 3T in SYSTEM 9. Install supplied jumper link across terminals D and E on terminal strip 3T.

4. Connect the two interconnecting cord ends together (see Figures 2-4 And 2-5).

2 - 6. OPTIONAL MOTORIZED SLIDE CONTROL WITH SYSTEM 9 CONNECTIONS (Figures 2-4, 2-5, And 2-6)

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*
- *Shut down the weld control and disconnect input power (115 vac) before making any terminal strip connections.*



TA-091 381

Figure 2 - 6. Motorized Slide Control (Joystick)

Route the cord from the Motorized Slide Control through the strain relief on the side of SYSTEM 9 and make connections as illustrated in Figure 2-5. This connection will correspond to up/down on the Motorized Slide Control nameplate. To connect the Motorized Slide Control for right/left operation when the slide is installed horizontally, proceed as follows:

1. Connect the red lead from Motorized Slide Control to terminal A on terminal strip 4T in SYSTEM 9.

2. Connect the black lead from Slide Control to terminal G on terminal strip 4T.

3. Connect the white lead from Slide Control to terminal H on terminal strip 4T.

4. Connect the brown lead from Slide Control to terminal B on terminal strip 4T.

5. Connect the green lead from Slide Control to terminal C on terminal strip 4T.

IMPORTANT: *Do not allow motor to receive two opposing directional signals at the same time, either from SYSTEM 9 or SYSTEM 9 and Motorized Slide Control (joystick).*

2 - 7. GUN MOUNTING PLATE (Figure 1-2)

WARNING: ELECTRIC SHOCK can kill; MOVING PARTS can cause injury.
- *Do not touch live electrical parts.*
- *Keep clear of pinch points.*

Holes are provided in the motorized slide gun mounting plate to allow the desired gun to be adapted to it. Mount the desired gun to the gun mounting plate.

IMPORTANT: *Ensure that the screws that hold the gun to the gun mounting plate do not stick out through the mounting plate since they may hit the slide cover and hinder operation (see Figure 1-2).*

SECTION 3 - OPERATOR CONTROLS

3 - 1. LIMIT SWITCH (Figure 4-1) - The limit switch on the gear housing provides a means of starting the slide from the same reference point when accurately-repeated, timed movements are required. This reference point is either all the way up on vertical installations or all the way to the right on horizontal installations.

When the slide actuates the limit switch, the motor turns off. A signal provided from either the SYSTEM 9 or MSC-2 will start the slide moving in the opposite direction.

3 - 2. LIMIT SWITCH (Customer Supplied) - A customer-supplied, normally-closed switch may be installed in a selected location within slide travel limits. Switch location is restricted to down on vertical installations and left on horizontal installations.

To install a limit switch, proceed as follows:

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*
- *Shut down weld control, MSC-2, and welding power source and disconnect them from line power employing "lockout/tagging procedures" before beginning this installation.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

1. Open slide access door.

2. Install limit switch in selected location.

3. Route leads from limit switch to inside of slide gear housing and to terminal strip 1T on inside of access door.

4. Remove jumper link from terminal strip 1T at terminals 1TB and 1TC as shown in Figure 4-1, and connect limit switch leads to these terminals.

5. Close and secure slide access door.

3 - 3. MSC-2 (Figure 2-2)

A. Power Switch

Placing the POWER switch in the ON position applies 115 volts ac to the unit and places it in an operational condition. Placing the POWER switch in the OFF position shuts the unit down.

B. Pilot Light

A pilot light is provided on the front panel to indicate that the POWER switch is ON and that the unit is energized.

3 - 4. MOTORIZED SLIDE CONTROL (Joystick; Standard On MSC-2 And Optional With The SYSTEM 9)(Figure 2-6) - The manually operated slide control (joystick) is a 4 direction control, providing a means of positioning the slide anywhere along its travel limits either vertically or horizontally, depending on the installation position of the motorized slide. If two slides are installed together, one horizontal and one vertical, only one slide control (joystick) is necessary to position both slides.

When a motorized slide is installed vertically, the slide control (joystick) can be used to raise the welding gun for loading and unloading weldments. When a motorized slide is installed horizontally, the slide control (joystick) can be used to maintain proper weld joint alignment.

IMPORTANT: *Do not allow motor to receive two opposing directional signals at the same time. Do not move joystick to send a opposing directional signal while SYSTEM 9 or an automatic device (weld control) is operating slide.*

SECTION 4 MAINTENANCE & TROUBLESHOOTING

WARNING: ELECTRIC SHOCK can kill.
- *Do not touch live electrical parts.*
- *Shut down unit and welding power source and disconnect input power employing "lockout/tagging procedures" before internally inspecting or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

MOVING PARTS can cause serious injury.
- *Keep clear of moving parts.*

HOT SURFACES can cause severe burns.
- *Allow cooling period before servicing.*

Troubleshooting of internal parts to be performed only by qualified persons.

IMPORTANT: *Periodically inspect the labels on the unit for legibility. All precautionary labels must be maintained in a clearly readable state and replaced when necessary. See Parts List for part number or precautionary labels.*

4 - 1. INTERCONNECTING CORDS - Periodically inspect all interconnecting cords for damage to or breaks in the insulation jacket, particularly at the plug. Repair or replace the cord(s) as necessary.

4 - 2. SLIDE

WARNING: ELECTRIC SHOCK can kill; MOVING PARTS can cause injury.
- *Do not touch live electrical parts.*
- *Keep clear of pinch points.*
- *Shut down unit and welding power source and disconnect input power employing "lockout/tagging procedures" before internally inspecting or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

The outside of the unit particularly around the neoprene seals, should be kept clean by blowing it off with a clean, dry airstream. Periodically, depending on conditions and usage, it may become necessary to clean and lubricate the slide. To clean slide components, proceed as follows:

1. Remove gun, mounting plate, and slide cover.
2. Wipe the two shafts clean and lubricate linear ball bearings (2) with a light weight oil (No. 20); the oil holes face up for ease of service. Do not overoil (see Parts List view).
3. Wipe screw shaft clean, and apply a thin coat of heavy weight oil (No. 90).
4. Reinstall cover, mounting plate, and gun.
5. Reconnect input power, and resume operating.

4 - 3. DRIVE BELT

WARNING: ELECTRIC SHOCK can kill; MOVING PARTS can cause injury.
- *Do not touch live electrical parts.*
- *Keep clear of pinch points.*
- *Shut down unit and welding power source and disconnect input power employing "lockout/tagging procedures" before internally inspecting or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

The drive belt is a toothed-type timing belt and should not need servicing. However, should adjustment or

replacement be required, provisions are made for tensioning the belt. To adjust drive belt, proceed as follows:

1. Remove cover over drive belt (see Parts List view).
2. Loosen bolts (4) in slotted holes.
3. Slide belt housing toward motor end. Belt should be snug, but not overtightened.
4. Retighten bolts (4).
5. Inspect drive gears for dirt. If necessary brush off and blow out with a clean, dry airstream.
6. Replace cover.

4 - 4. FUSE PROTECTION (Figures 2-2 And 4-2)

WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Shut down unit and welding power source and disconnect input power employing "lockout/tagging procedures" before internally inspecting or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

Fuse F1 on MSC-2 front panel protects the unit circuitry by interrupting the incoming 115 volts ac should an overload condition develop. Should this fuse open, the unit would be completely inoperative. To replace the fuse, proceed as follows:

CAUTION: IMPROPER FUSES can damage this unit.

- *If replacement becomes necessary, use only fuses of the proper size, type, and rating.*

1. Depress and rotate fuse holder cover counterclockwise.
2. Pull out fuse with cover when fuse holder cover is free.
3. Insert new fuse into fuse holder cover.
4. Install fuse with fuse holder cover back into unit.
5. Depress and rotate fuse holder cover clockwise until cover is secure.

4 - 5. TROUBLESHOOTING CHART

WARNING: ELECTRIC SHOCK can kill.

- *Do not touch live electrical parts.*
- *Shut down unit and welding power source and disconnect input power employing "lockout/tagging procedures" before internally inspecting or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

Troubleshooting of internal parts to be performed only by qualified persons.

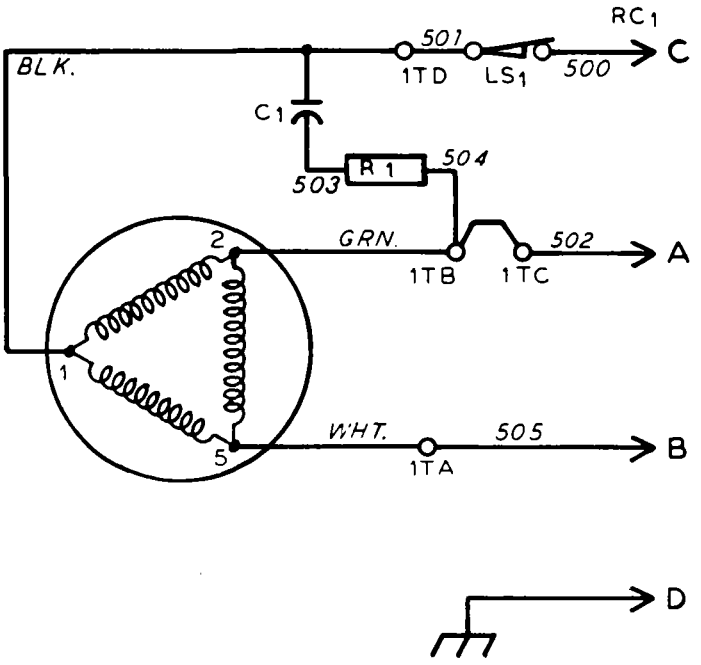
The following chart is designed to diagnose and provide remedies for some of the troubles that may develop in the motorized slide and MSC-2.

It is assumed that proper installation has been made, according to Section 2 of this manual, and that the motorized slide and MSC-2 have been functioning properly until trouble developed.

Use this chart in conjunction with the circuit diagram while performing troubleshooting procedures. If the trouble is not remedied after performing these procedures, the nearest Factory Authorized Service Station should be contacted. In all cases of equipment malfunction, the manufacturer's recommendations should be strictly followed.

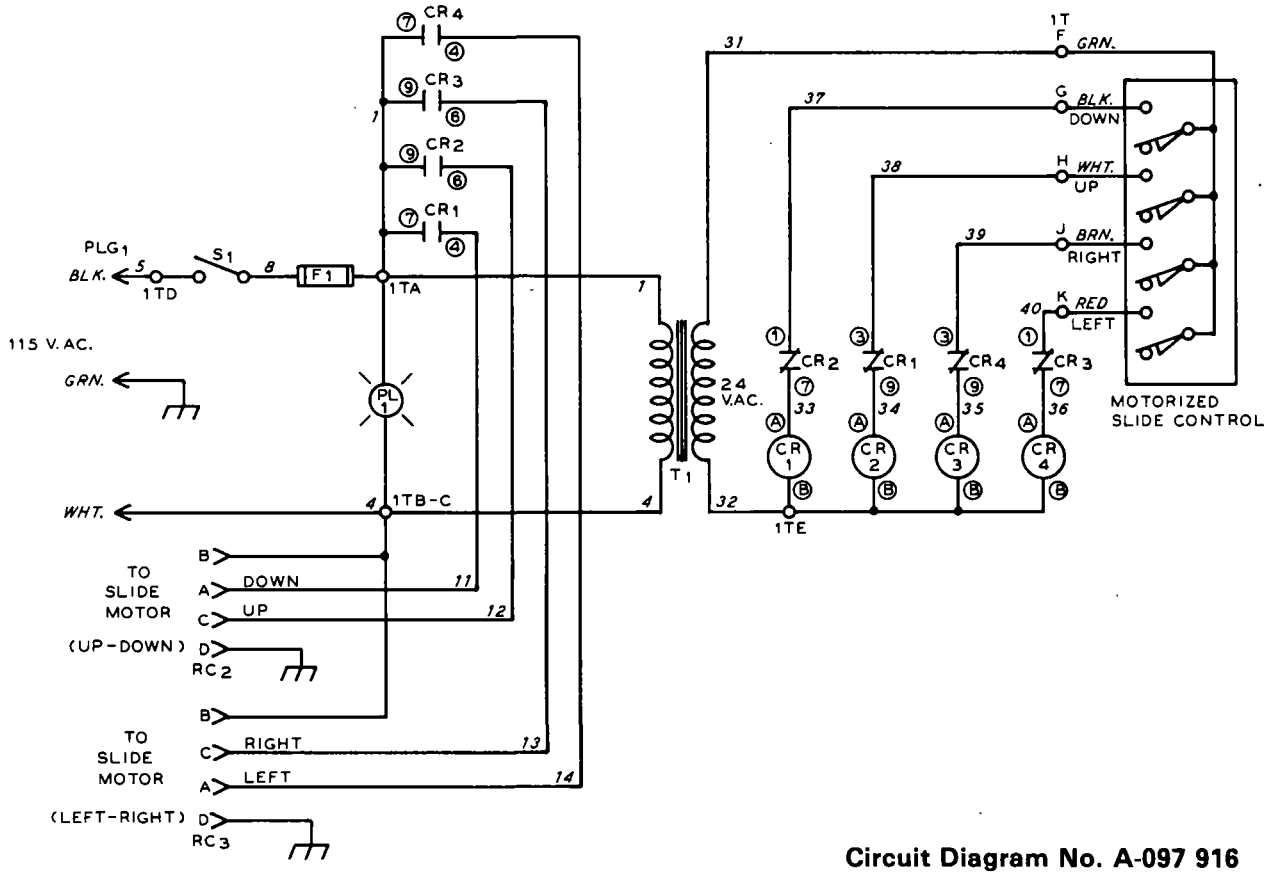
TROUBLE	PROBABLE CAUSE	REMEDY
Unit completely inoperative; pilot light PL1 not on.	Fuse F1 open.	*Replace fuse F1.
Erratic operation.	Plug(s) not secure in receptacle(s).	Check all plugs, and ensure that they are secure in receptacles.
Improper operation or no operation in one direction.	Poor or loose terminal strip connections.	Check connections according to Section 2.
	A relay CR1, 2, 3, or 4 is inoperative.	Check and replace relay(s).
Slide stalled and motor hums.	Obstruction or excessive loading.	Remove obstruction and/or reduce loading.

*Be sure replacement fuse is same size, type, and rating.



Circuit Diagram No. A-099 350

Figure 4 - 1.Circuit Diagram For Motorized Slide



Circuit Diagram No. A-097 916

Figure 4 - 2. Circuit Diagram For MSC-2

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PARTS LIST

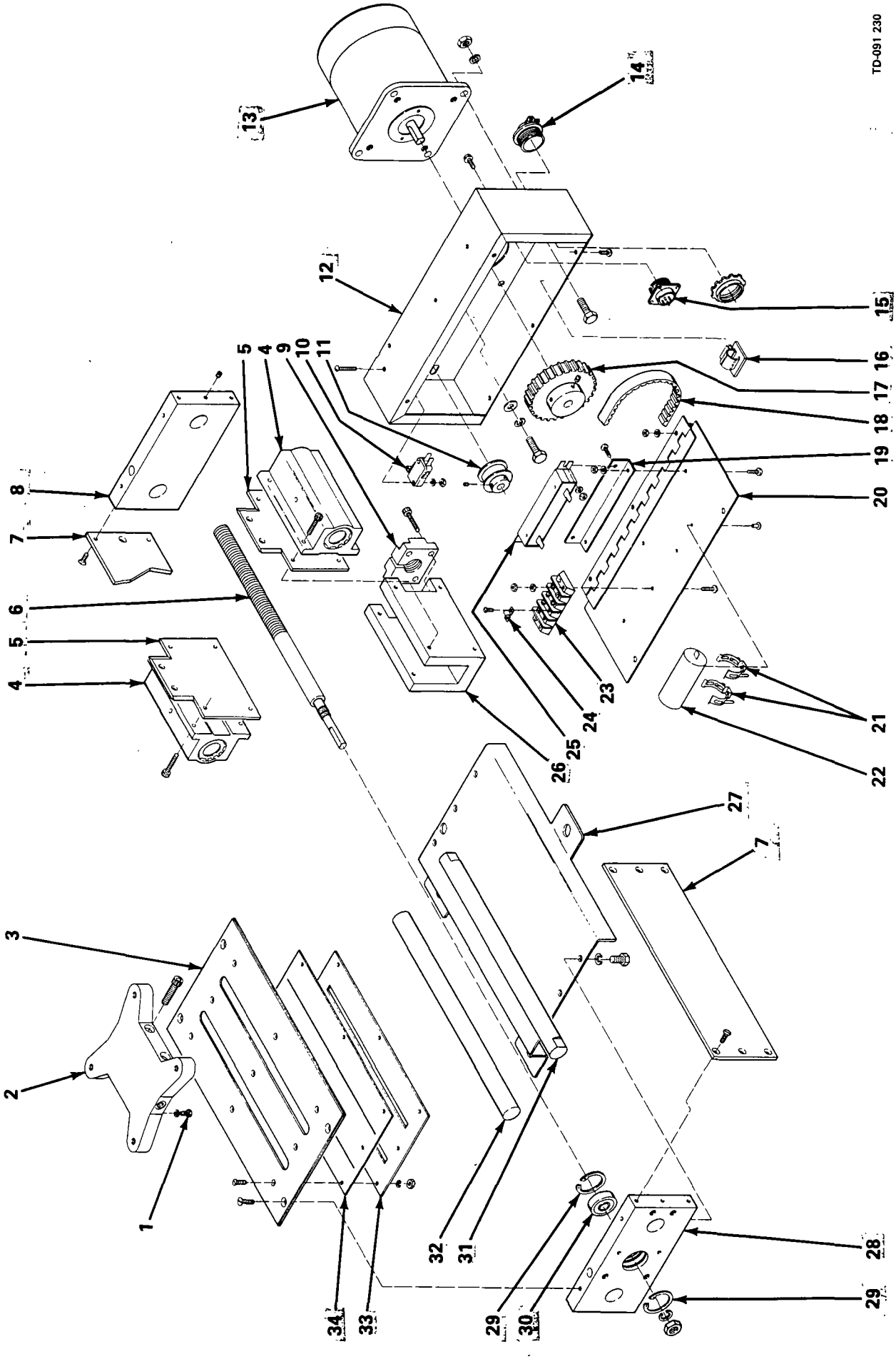

Figure A - Motorized Slide

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure A			**Motorized Slide**	
1		009 278	FOOT, closer-seal	4
2		090 683	PLATE, mounting	1
3		009 259	COVER	1
4		009 291	PILLOW BLOCK, 3/4 shaft	2
5		009 256	STRIP, support	2
6		090 747	SCREW, lead	1
7		009 255	BAR, side	2
8		053 451	END PLATE, left side drive	1
9		090 746	MOUNTING FLANGE, ball joint	1
10	LS1	089 645	SWITCH, limit 11 amp 125 volts	1
11		090 744	PULLEY, gear belt	1
12		090 640	CASE, motor/gear	1
13		090 742	MOTOR	1
14		010 610	CONNECTOR, clamp-cable 1/2 inch	1
15	RC1	076 624	RECEPTACLE, 4 pin MS-3102A-14S-2P	1
16		059 712	CLIP, plastic-cable	5
17		009 287	PULLEY, gear belt	1
18		089 934	BELT, gear 19 inches long	1
19		090 637	BRACKET, mtg-resistor	1
20		090 634	DOOR, access	1
21		007 532	CLAMP, capacitor 1 inch	2
22	C1	089 475	CAPACITOR, metal film 7.5 uf 220 volts ac	1
23		038 081	BLOCK, terminal 20 amp 4 pole	1
24		601 219	LINK, jumper	1
25	R1	089 773	RESISTOR, WW fixed 100 watt 200 ohm	1
26		097 401	BLOCK, carriage	1
27		009 257	PAN, base	1
28		053 452	END PLATE, right side drive	1
29		073 240	RING, retaining-internal 1-3/8	2
30		053 428	BEARING, ball	1
31		009 290	SHAFT, oscillator	1
32		009 240	SHAFT, oscillator	1
33		009 251	CLAMP, retainer-seal	1
34		009 250	SEAL, clamp retainer	1
		099 331	CABLE, control slide (consisting of)	1
		053 075	. PLUG, 4 pin MS-3106A-14S-2P	1
		604 571	. CORD, No. 18 4/c (order by ft)	10ft
		039 828	. CLAMP, cable	1
		007 826	CORD, No. 18 3/c (order by ft)	2ft

BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.

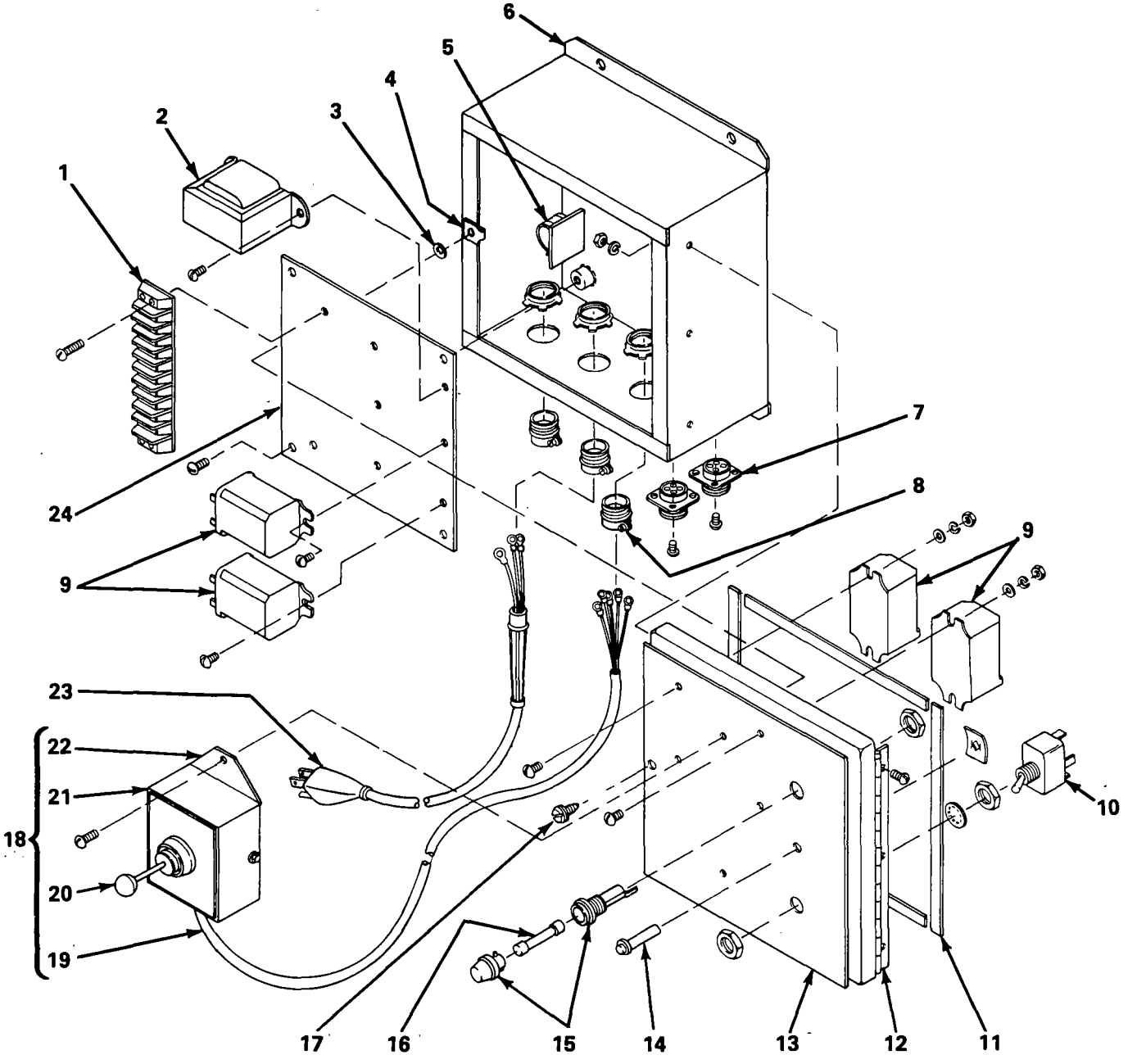

Figure B - MSC-2

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure B			**MCS-2**	
1	1T	038 782	BLOCK, terminal 20 amp 10 pole	1
2	T1	098 233	TRANSFORMER, control	1
3		010 855	RETAINER, screw No. 2	1
4		605 670	NUT, speed 12-24	1
5		045 852	CLIP, 11/16	1
6		098 396	CABINET, control	1
7	RC2,3	073 687	RECEPTACLE, 4 socket MS-3102A-14S-2S	2
8		010 610	CONNECTOR, clamp-cable 1/2	3
9	CR1-4	006 393	RELAY, enclosed 24 volts ac DPDT flanged	4
10	S1	011 609	SWITCH, toggle SPDT 15 amp 125 volts	1
11		603 115	WEATHERSTRIPPING, 1/8 x 3/8 (order by ft)	3ft
12		098 387	DOOR, control-cabinet	1
13			NAMEPLATE	1
14	PL1	074 188	LIGHT, indicator-red lens	1
15		046 432	HOLDER, fuse	1
16	F1	*012 658	FUSE, miniature-glass slo blo 2 amp	1
17		010 853	FASTENER, screw No. 2	1
18		+089 972	SLIDE CONTROL, motorized (consisting of)	1
19		052 246	. CABLE, power 5/c (order by ft)	12ft
		010 476	. BUSHING, strain-relief 5/8 x .570 hole	1
20		090 117	. SWITCH, joy stick-momentary	1
21		090 639	. CASE, switch-housing	1
22		090 638	. BASE, switch-housing	1
		083 136	. BUTTON, bumper	4
23	PLG1	096 822	CORD, power 10ft	1
24		098 389	PANEL, mtg-components	1

*Recommended Spare Parts.
+ Slide Control is included with MSC-2 control, but not optional for Motorized Slide.
BE SURE TO PROVIDE MODEL AND SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS.